

CLAIMS

Claim 1. (Currently amended). An improved vapor generator and control system comprising:

- (1) a vaporization chamber for generating superheated vapor substantially instantaneously from liquid upon its entry therein[;] ~~and~~ said vaporization chamber defining at least one input port for input therethrough of liquid for vaporization in said vaporization chamber;
- (2) liquid supply means connectible to said vaporization chamber for supplying liquid thereto through said input; and
- (3) adjustable control means for adjustably controlling ongoing input of liquid from said liquid supply means during ongoing input of said liquid from said liquid supply means into said vaporization chamber, adjustment of liquid input by said adjustable control means being substantially simultaneously reflected in adjustment of output of superheated vapor, whereby generation output of superheated vapor is highly precisely adjustably controllable while said system is in operation.

Claim 2. (Previously Amended). The invention as set forth in Claim 1 wherein said adjustable control means adjustably controls volume of liquid input into said vaporization chamber and thereby adjustably controls volume of output of superheated vapor from said vaporization chamber.

Claim 3. (Original). The invention as set forth in Claim 1 further including at least one output port for output therethrough of superheated vapor from said vaporization chamber, said at least one output port including means connectable to output control means for controlling output from said vaporization chamber.

Claim 4. (Previously Amended). The invention as set forth in Claim 3 wherein said adjustable [output] control means for adjustably controlling input of liquid into said vaporization chamber

adjustably controls pressure of liquid input into said vaporization chamber and thereby
adjustably controls pressure of output from said vaporization chamber.

Claim 5. (Original). The invention as set forth in Claim 3 wherein said output control means
controls volume of output from said vaporization chamber.

Claim 6. (Original). The invention as set forth in Claim 3 wherein said output control means
comprises at least one valve member.

Claim 7. (Original). The invention as set forth in Claim 3 wherein said output control means
includes means for directing in a selected direction superheated vapor from said vaporization
chamber.

Claim 8. (Original). The invention as set forth in Claim 7 wherein said output control means
comprises at least one valve member.

Claim 9. (Original). The invention as set forth in Claim 7 wherein said output control means
is adjustable for directing superheated vapor from said vaporizing chamber in a plurality of
selected directions.

Claim 10. (Original). The invention as set forth in Claim 8 wherein said at least one valve
member comprises a plurality of valve members at least two of which are adjustable to direct
output superheated vapor in substantially perpendicular directions.

Claim 11. (Original). The invention as set forth in Claim 3 wherein said output port is
connectable to at least one object to which superheated vapor is to be directed.

Claim 12. (Original). The invention as set forth in Claim 3 wherein said output control means is
connectable to at least one object to which superheated vapor is to be directed.

Claim 13. (Original). The invention as set forth in Claim 1 wherein said vaporization chamber has at least a portion of an inner surface which is rough.

Claim 14. (Original). The invention as set forth in Claim 1 wherein said vaporization chamber has at least a portion of an inner surface which defines at least one groove.

Claim 15. (Original). The invention as set forth in Claim 14 further including at least one groove other than the first-mentioned groove and wherein said first-mentioned groove and said second-mentioned groove intersect.

Claim 16. (Original). The invention as set forth in Claim 1 wherein said vaporization chamber has at least a portion of an inner surface which defines a plurality of grooves.

Claim 17. (Original). The invention as set forth in Claim 16 wherein said plurality of grooves vary substantially randomly in depth in a range substantially .030 inch to .050 inch.

Claim 18. (Original). The invention as set forth in Claim 4 wherein said output control means is configured to be hand-held by an operator and to be controlled by said operator.

Claim 19. (Original). The invention as set forth in Claim 1 wherein said vaporization chamber has at least a portion of an inner surface which includes at least one perforation.

Claim 20. (Original). The invention as set forth in Claim 1 wherein said vaporization chamber has at least a portion of an inner surface which includes at least one irregularity.

Claim 21. (Currently Amended). A method of fabricating a superheated vapor generator and control system comprising the steps of:

- (a) providing at least two separate parts of a vapor generator;
- (b) fastening said parts together to form a superheated vapor generator defining a vaporization chamber with at least one input thereto, said superheated vapor

generator having capability for substantially instantaneous vaporization of liquid upon entry thereof into said vaporization chamber; and

(c) providing liquid supply means connectible to said input of said vaporization chamber for supplying liquid thereto; and

(d) ~~providing means for connecting to~~ adjustable control means ~~for input to said vapor generator~~ for adjustably controlling ongoing input of liquid into said vaporization chamber during said ongoing input of liquid, adjustment of liquid input by said adjustable control means being substantially simultaneously reflected in adjustment of output of superheated vapor thereby providing the capability of highly precisely adjustably controlling output of superheated vapor from said vaporization chamber without requiring said system to cease operation.

Claim 22. (Original). The method as set forth in Claim 21 further including the step of providing control means at the output of said vapor generator.

Claim 23. (Original). The method as set forth in Claim 21 further including the step of defining at least one groove in at least a portion of an inner surface of at least one of said ports.

Claim 24. (Original). The invention as set forth in Claim 21 further including the step of defining a plurality of grooves in at least a portion of an inner surface of at least one of said ports, such that said grooves vary in depth substantially randomly in height and depth in the range of .030 inch to .050 inch.

Claim 25. (Original). The invention as set forth in Claim 22 wherein said output control means are adjustable to control the direction of superheated vapor from said vaporization chamber.

Claim 26. (Currently Amended). A method for cleaning selected objects comprising the steps of:

- (a) generating superheated vapor by substantially simultaneously vaporizing liquid into superheated vapor through subjecting said liquid to superheating; and
- (b) providing capability of adjustably controlling volume, pressure or velocity on line of output superheated vapor for a selected object to be cleaned by adjustably controlling in an ongoing manner volume, pressure or velocity of said liquid upon being subjected to said superheating, wherein said output is substantially instantaneously adjustable upon adjustment of said input thereby providing highly precise control of output of superheated vapor.

Claim 27. (Currently Amended). A method for propulsion comprising the steps of:

- (a) generating superheated vapor by substantially instantaneously vaporizing liquid into superheated vapor through subjecting said liquid to superheating; and
- (b) providing the capability of ~~controlling~~ highly precise control of output of superheated vapor substantially continuously to provide propulsion, by ~~adjustably controlling~~ adjustable control of volume, pressure or velocity of said liquid upon being subjected to said superheating, adjustment of said adjustable control being substantially simultaneously reflected in said output of superheated vapor.

- - REMARKS - -

Claims 1-27 remain in the case. Claims 1, 21, 26, 27 have been currently amended to point out more particularly Applicant's invention, without addition of new matter.

None of the references, taken singly or in combination, discloses or suggests Applicant's invention, nor is there any evidence of obviousness of any of the currently amended claims. The PTO has wholly failed to discharge its burden of proof of alleged obviousness of the amended claims. As shown hereinbelow, decisive evidence is adduced of nonobviousness per the "secondary considerations" of *Graham v. John Deere*.

I. REJECTION OF AMENDED CLAIMS 1-27 FOR ALLEGED OBVIOUSNESS UNDER 35 USC §103 IS LEGALLY AND FACTUALLY ERRONEOUS AND SHOULD BE RECONSIDERED AND WITHDRAWN.

In formulating a rejection under 35 USC Sec. 103(a) based on a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed. Memorandum to the Patent Examining Corps, responding to the *KSR* decision, Margaret A. Focarino, Deputy Commissioner for Patent Operations, quoted in Patent, Trademark, and Copyright Journal, vol. 74 #1828, page 380 (July 27, 2007).

"To determine whether there was an apparent reason to combine the known elements in the way a patent claims, it will often be necessary to look to the interrelated teachings of multiple patents; to the effects of demands known to the design community or present in the marketplace; and to the background knowledge possessed by a person having ordinary skill in the art. To

facilitate review, this analysis should be made explicit.” KSR Int’l Co. v. Teleflex, Inc., #04-1350 (550 US ____)(April 30, 2007), 82 USPQ 2d 1385 (74 PTCJ 5,5/4/07), at 14.

“First, there must be some suggestion or motivation...to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.” MPEP Sec. 2142.

In *KSR*, the Supreme Court cited with approval the *Graham v. John Deere* standard for making an obviousness determination whereby “secondary considerations such as commercial success, long felt but unsolved needs, failure of others, etc. might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” *KSR*, at 2. Under the foregoing governing authorities, the Office Action clearly has failed to discharge the PTO’s burden of identifying the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed. Further, the Office Action has failed to take account the solution of long-felt but unsolved needs provided by the invention as shown hereinbelow.

A. THE REJECTION OF CLAIMS 1-8 AND 11-27, UNDER 35 USC 103 (a) AS BEING ALLEGEDLY UNPATENTABLE OVER FRIEDHEIM (U.S. 5,471,556) or FRIEDHEIM (U.S. 4,414,037) IN VIEW OF HUTCHINSON (U.S. 6,393,212), UTTERLY FAILS TO MEET THE REQUIREMENTS IMPOSED BY LAW FOR SUCH REJECTION TO BE VALID.

The Office Action erroneously refers to the Hutchinson adjustable control means (22) connected to the Hutchinson pump (20) as being “for controlling the input liquid into the

vaporization chamber to further control the pressure and volume of the output steam.”

Office Action, 4/10/2007, page 2. The Hutchinson device in fact is a steam generator operating within an immersible heater in a liquid, whereas the invention of the application is based upon a flash boiler with a superheated vaporization chamber. The internal parts of the Hutchinson device function as baffles to create turbulent mixing as the water in the Hutchinson device heats to create sufficient pressure for steam to be emitted. Regulation of output is accomplished by spray nozzles and controls thereof at the output of the Hutchinson device. See for example, Hutchinson, column 3, lines 39-48; see also column 8, lines 27-29 (emphasis added). In the above-cited passages, it is clear that the Hutchinson device regulates output by means of the output regulator 48 at the output and that the generation of superheated steam is a slow, step-by-step process (as opposed to a virtually instantaneous process in the flash boiler employed by Applicant’s Invention): “Water is injected in an input and flows through a series of time delay turbulent [sic.] creating baffles positioned in the heating cylinder to form a diffused flow path of variable length and dwell time as it passes from the input to the exit. In the steam generating mode, the diffused spiral flow path will cause the small amount of water injected in the input to be converted to steam as it is transported to the output port.” Hutchinson, column 3, lines 42-48.

“Another unique feature [in Hutchinson] is the use of a variable pressure control valve 48 at the output 14 of steam generating cylinder 10. Variable pressure control valve 48 allows both the pressure and flow volume of the steam output of the heater/baffle system to be controlled. Variable pressure control valve 48 also provides further regulation of the

overall fluid/vapor dwell time for the formation of steam within steam generating cycle

10. Variable pressure control valve 48 also allows direct control of output pressure...”

Hutchinson, column 8, lines 28-29 (emphasis added).

This is in complete contrast to the regulation feature of the instant invention at the input including adjustable control means for providing “highly precise” adjustable control of ongoing input of liquid controlling ongoing input of liquid during ongoing input of said liquid into said vaporization chamber whereby “output of superheated vapor is highly precisely adjustably controllable while said system is in operation”, “adjustment of liquid input by said adjustable control means being substantially simultaneously reflected in adjustment of output of superheated vapor...,” as recited in currently amended claim 1. Similar recitals appear in currently amended claim 21, currently amended claim 26, and currently amended claim 27.

The Office Action apparently bases at least part of the rejection on an erroneous contention concerning the control means 22 connected to the pump 20 in Hutchinson. As stated in Hutchinson, “A centrally locating [sic.] heating body 15 receives power input at 18 from a heater control 20 controlled by electronic control system 22. Fluid is supplied to inlet 12 from supply tube 24 connected to reservoir 26 or other source of fluid. Fluid is pumped via tube 24 from tank 26 by a low volume pulse pump 30 through check valves 32 and 34. “...Electronic control system 22 monitors the temperature and pressure in steam generating cylinder 10, and also the level of water in the water tank 26. Pulse type piston pump 30 provides low flow capacity and pressure required to inject

feed water into input 12 against the steam generating cylinder 10 internal pressure as regulated by output variable pressure regulating control valve 48.” Hutchinson, Column 6, lines 30-36;54-60. (Emphasis added).

The Office Action appears to be predicated upon the misapprehension that the control means 22 in Hutchinson controls output by controlling input liquid when in fact the only control of output is at control valve 48 and all that control system 22 controls is power input, not fluid input.

There would be no point in attempting to control output by fluid input in Hutchinson because of its slow operating speed.

A further misconception apparently underlying the Office Action is that there is some kind of analogy between Applicant’s invention and the alleged possibility of adjusting the volume of water in Hutchinson delivered to the Hutchinson cylinder 10 at input 12. It is stated that such adjustment can be accomplished by varying piston diameter of pump piston 74, the diameter of eccentric arm 38, and the RPM of drive motor 36. This clearly does not show or suggest in any manner the highly precise adjustable control whose “adjustment [is] substantially simultaneously reflected in adjustment of output” during ongoing input of liquid adjustably controlling output while the system is in operation as recited in currently amended claim 1 herein, similar language being present in currently amended claim 21, currently amended claim 26, and currently amended claim 27.

Accordingly, it is respectfully submitted that the Office Action does not discharge the PTO's burden of demonstrating obviousness by combining references, nor does it provide a valid combination of references in that clearly, the basic structures of applicant's invention and of the Hutchinson apparatus are so different that it would be unfeasible, impractical, ineffective and contraindicated to import the input adjustable control means of Applicant's invention into Hutchinson's device such that one of normal skill in the art would not engage in such combination.

The Office Action has clearly and unambiguously failed to "identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed," as mandated by Deputy Commissioner's memorandum to the Patent Examining Corps, *supra*. The Office Action has also clearly and unambiguously failed to meet the requirement "to make an explicit analysis of whether there was an apparent reason to combine known elements in patent claims," as mandated in *KSR, supra*. The Office Action has further clearly and unambiguously failed to demonstrate, as required by MPEP Sec. 2142, "First, there must be some suggestion or motivation to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference or references, when combined, must teach or suggest all the claim limitations."

It is notable that none of the above-stated requirements has been met and that consequently, the Office Action is in error, must be reconsidered, and withdrawn as to currently amended claims 1, 21, 26, 27 as well as dependent claims 2-8, 11-20, and 22-

25, since the dependent claims include the patentable elements of the currently amended independent claims.

B. THE INVENTION OF THE APPLICATION FILLS A LONG-FELT UNSOLVED NEED AND THUS EVIDENCE OF PATENTABILITY AND NONOBVIOUSNESS IS PROVIDED.

As stated in the concurrently-filed declaration of Terry Munson, the precise control of output superheated steam uniquely provided by apparatus in accordance with applicant's invention, fills a previously unsolved need where others have failed.

As noted in section A., *supra*, the U.S. Supreme Court, in the *KSR* case approved the *Graham v. John Deere* criteria for determining obviousness comprising "secondary considerations" such as "commercial success, long-felt but unsolved needs, failure of others, etc." *KSR* at 2. These considerations are strongly in evidence herein: long felt but unsolved needs and failures of others as established by the declaration of Terry Munson filed concurrently herewith.

As stated in the Munson Declaration, the device employed by the declarant is employed in the declarant's business and activity in the diagnosis and prediction of failures due to surface conditions as well as providing means and procedures for eliminating such sources of failure. Among the particular projects with which the declarant's company is involved are "Diagnosing and eliminating causes of failure in circuit boards and

electronic hardware; plastic housing, special implants (such as titanium devices) and small soldered areas.” Munson Declaration, para. 3.

The declarant employs cleaning to a 100% level of cleanliness in order to prevent failure including such cleaning for medical implants. As stated by the declarant, “Once we have located the impurities/dirt and the like, it is our task to eliminate these. For this purpose, Max Friedheim’s device, which is the subject matter of the instant patent application, has proved invaluable. Particularly important is the ability of the operator to control precisely the amount of superheated steam, its velocity, pressure, duration of burst, and direction afforded by Mr. Friedheim’s product sold under the name Model 6609 with control on the input side.

“By the aforesaid precise control of the superheated vapor from Mr. Friedheim’s apparatus, superheated vapor- on occasion containing cleaning material- optimal cleansing can be achieved without risk of damage to the object being cleaned.” Munson Declaration, paras. 7,8.

“Another application of my [the Declarant’s] detection technology and Mr. Friedheim’s cleaning technology is in the field of eyeglasses, including frames and lenses. It is clear that such devices must be required to have a very high standard of hygiene, and the combination of technologies allows that to be accomplished. With the control capability of Mr. Friedheim’s apparatus, bursts of cleaning solution can be precisely timed to be in the region of 30-90 seconds, as well as affording the capability of controlling the timing

between bursts. With Mr. Friedheim's multi-chamber apparatus an essentially continuous emanation of superheated steam can be accomplished." Munson Declaration, para. 9.

"The great benefit of the use of the Friedheim cleansing technology is that in real time as dirt/impurities are detected, they can be eliminated through the application of a superheated cleansing vapor under precise control of the operator, as opposed to the requirement of detection and later dipping and/or steaming and/or washing the dirt/impurities.

Having been in the field of dirt/impurities on surfaces as a component of error prediction and analysis, it is my [Declarant's] firm conviction that the Friedheim cleansing technology as embodied in the instant patent application fills a long-felt but unfulfilled need in this field, and has no competition in the patent literature or in the marketplace in terms of effectiveness or ease of use." Munson Declaration, paras. 12-13.

Accordingly compelling evidence of nonobviousness in the form of sworn testimony regarding long-felt and unsolved needs fulfilled by Applicant's invention and failures of others to achieve the results of Applicant's invention, having been adduced, rejection on the ground of obviousness is error which should be reconsidered and withdrawn. *KSR*, *supra*. at 2.

C. REJECTION OF CLAIMS 9 AND 10 UNDER 35 USC 103 (a) AS BEING
ALLEGEDLY UNPATENTABLE OVER FRIEDHEIM (U.S. 5,471,556) OR

FRIEDHEIM (U.S. 4,414,037) IN VIEW OF HUTCHINSON (U.S. 6,393,212) AS APPLIED TO CLAIMS 1-8, and 11-27, AND FURTHER, IN VIEW OF BERTHOUD (U.S. 3,863,841) UTTERLY FAILS TO MEET THE REQUIREMENTS IMPOSED BY LAW FOR SUCH REJECTION TO BE VALID.

The argument and evidence presented in sections A, B *supra*. apply to render the subject rejection clearly invalid. As noted above, the Office Action clearly failed to demonstrate obviousness by combination of Friedheim '556, or Friedheim '037 with the Hutchinson reference. All the more so when a third reference from a wholly different field is attempted to be grafted onto the impermissible combination of Friedheim '037 or Friedheim '556 with Hutchinson. The Berthoud reference subject matter relates to a liquid spraying device applicable particularly in agriculture to spray insecticides and/or fungicides or fertilizers. Berthoud, Col. 1 Lines 4-6. There is nothing in the *KSR* case or in the above-cited Patent Office materials permitting such hindsight reconstruction. There is, for example, no explicit analysis of whether there was an apparent reason to combine known elements in patent claims; there is no identification of a reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed; nor is there some suggestion or motivation to modify the reference or to combine reference teachings, with a reasonable expectation of success, with the prior art references, when combined, teaching or suggesting all the claim limitations.

In addition, the patentability of the underlying claim (currently amended claim 1) demonstrated above renders the rejection invalid since the claimed combination contains patentable elements.

Accordingly, the rejection under 35 USC 103 (a) of claims 9 and 10 on Freidheim '037 and/or Friedheim '556 in view of Hutchinson as applied to claims 1-8 and 11-27 and further in view of Berthoud, is invalid, must be reconsidered, and should be withdrawn.

II. CONCLUSION.

On the basis of the foregoing, it is respectfully submitted that the claims as currently amended, are patentable, that all rejections and objections thereto should be reconsidered and withdrawn, and that all claims should be allowed.

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